

**Work Order ID 57549**

April 8, 2010 9:21:22 AM

Page 1

Item ID: D3294-1

Accept

Setup Start

Revision ID:

Stop

Item Name: Bracket

Start Date: 4/08/10 Start Qty: 12.00

Cust Item ID:

Required Date: 4/16/10 Req'd Qty: 12.00

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D3294

Rev C

100

0.00



Waterjet

Memo

0.00

FLOW CNC Waterjet

1-Cut as per Dwg D3294

Dwg Rev: CProg Rev: C

\*grain direction on a 45 deg as per dwg\*\*

2-Deburr if necessary

1310-4-13

②

Pho →

110

QC2- Inspect parts off machine FAI/FAIB

0.00



QC

Memo

0.00


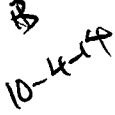



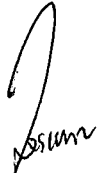
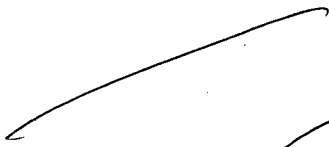
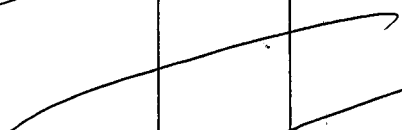
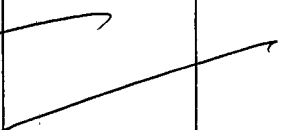

Quality Control

1310-4-13

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D3294-1 PAR #: N/A Fault Category: Sm Fabs NCR: Yes No DQA: 10 Date: 10.05.03  
 Resolution: Scrap Disposition: Scrap QA: N/C Closed: 10/05/03 Date: 10/05/03

NCR: <u>57549</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
10/04/14	#100	Found at inspection a piercing line through a .125" rivet hole. Line / groove is 0.50" in length and 0.010" deep and 0.030" wide.		Scrap & destroy No replace	 10-4-14	 10/04/14		 10/04/14
		R.C water jet mould with probe still coming out of tip to another location. Machine malfunction						 10/04/14

NOTE: Date & initial all entries

# Work Order ID 57549

April 8, 2010 9:21:22 AM



Page 2

Item ID: D3294-1

Accept



Setup Start



Revision ID:

Item Name: Bracket

Stop



Start Date: 4/08/10 Start Qty: 12.00



Cust Item ID:

Required Date: 4/16/10 Req'd Qty: 12.00

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120  QC Quality Control	QC8- Inspect parts - second check  Memo	0.00  0.00	S10604/14			(+12)	(+1)		
130  Brake NC Brake NC	Memo 1-Deburr if necessary 2-Bend as per Dwg D3294 (Ensure angle is correct)	0.00  0.00	SB 11/04/20			(1)			
140  QC Quality Control	QC5- Inspect part completeness to step on W/O  Memo	0.00  0.00	S10604/21			(+1)			

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 57549**

April 8, 2010 9:21:23 AM



Page 3

Item ID: D3294-1

Accept



Setup Start



Revision ID:

Stop



Item Name: Bracket

Start Date: 4/08/10

Start Qty: 12.00



Cust Item ID:

Required Date: 4/16/10

Req'd Qty: 12.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

Chemical Conversion Coat per QSI005 4.1

0.00

JL 10/04/21



HandFinish

Memo

0.00

Hand Finishing

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

JL 10/04/26 (11)

170

0.00



Small Fab

Memo

0.00

Small Fab

1-Install D3294-5 doubler to D3294-3 bracket with rivets as per dwg. D3294

JL 10/04/26 (11)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 57549

April 8, 2010 9:21:23 AM



Page 4

Item ID: D3294-1

Accept



Setup Start



Revision ID:

Stop



Item Name: Bracket

Start Date: 4/08/10

Start Qty: 12.00



Cust Item ID:

Required Date: 4/16/10

Req'd Qty: 12.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

180

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8:10/4/20

(KLL)

190

Black Sandtex(Ref:4.3.5.7) per QSI005 4.3

0.00



Powdercoat

Memo

0.00

Powder Coating

Start Time: 11:30 AM

Oven Temperature: 320°F

Finish Time: 2:00 PM

=> M 10/04/27

(KLL)

200

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

(KLL) 10/04/27

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# Work Order ID 57549

April 8, 2010 9:21:23 AM



Page 5

Item ID: D3294-1

Accept



Setup Start



Revision ID:

Stop



Item Name: Bracket

Start Date: 4/08/10

Start Qty: 12.00



Cust Item ID:

Required Date: 4/16/10

Req'd Qty: 12.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

210

Identify as per dwg & Stock Location: 210

0.00



Packaging

Memo

0.00

Packaging

10-4-27 SP (112)

220

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/04/28 JG

MF  
10-4-28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

April 8, 2010 9:21:21 AM

Page 1

Work Order ID: 57549

Parent Item: D3294-1

Parent Item Name: Bracket

Comments: IPP ☐ A ☐ 04.08.24 ☐ New issue ☐ KJ/JLM ☐  
 IPP Rev:B Now On Waterjet 07-03-26 JLM  
 IPP Rev:C 08-07-16 Redesign part DD verified by:EC  
 IPP Rev:D 08-10-06 revB as per dwg DD verified by:EC

Start Date: 4/08/10

Required Date: 4/16/10

Start Qty: 12.00

Required Qty: 12.00

M2024T3S.080

Purchased

No

100

sf

192.0000 22.7368



2024-T3 .080 sheet

1810-4-13

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

MAT22

192

104921

2

105411

7

112331

3

113796

36

114025

144

D3294-5

Manufactured

No

170

Each

41.0000 12.0000



Doubler

114025

9510/04/26

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

WA

41

55331

41

MS20470AD4-5

Purchased

No

170

Each

644.0000 180.0000



Rivet, Universal Head

11X

9510/04/26

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST319

644

111916

644

165

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 57549
<b>Description:</b> Bracket Assembly		<b>Part Number:</b> D3294-1
<b>Inspection Dwg:</b> D3294	<b>Rev:</b> C	<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Ø0.129	+0.005/-0.001	.129	*			
Ø0.141	+0.005/-0.001	.143	*			
6.708	+/-0.010	6.708	*			
1.118	+/-0.010	1.118	*			
5.590	+/-0.010	5.591	*			
1.118	+/-0.010	1.118	*			
13.563	+/-0.010	13.563	*			
1.043	+/-0.010	1.044	*			
0.625	+/-0.010	.627	*			
0.325	+/-0.010	.327	*			
0.300	+/-0.010	.300	*			
0.400	+/-0.010	.400	*			
6.000	+/-0.010	6.002	*			
1.000	+/-0.010	1.000	*			
17.124	+/-0.010	17.133	*			
16.13	+/-0.030	16.125	*			
7.27	+/-0.030	7.261	*			
11.97	+/-0.030	11.97	*			
8.37	+/-0.030	8.37	*			
20.05	+/-0.030	20.05	*			
12.98	+/-0.030	12.98	*			
14.59	+/-0.030	14.59	*			
11.66	+/-0.030	11.66	*			
0.080	+/-0.010	.076	*			

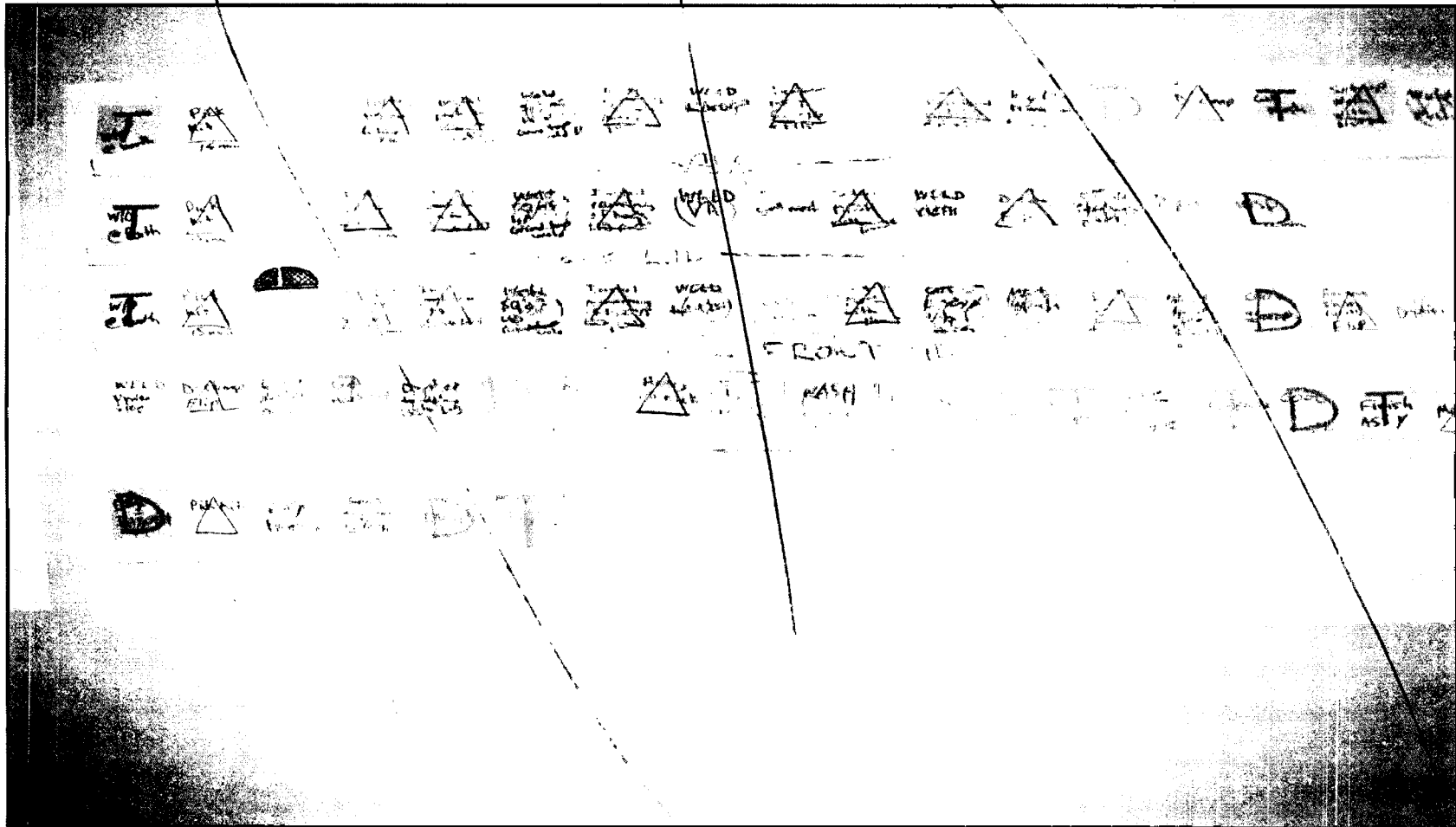
<b>Measured by:</b> B
<b>Date:</b> 10-4-13

<b>Audited by:</b> S
<b>Date:</b> 10/4/14

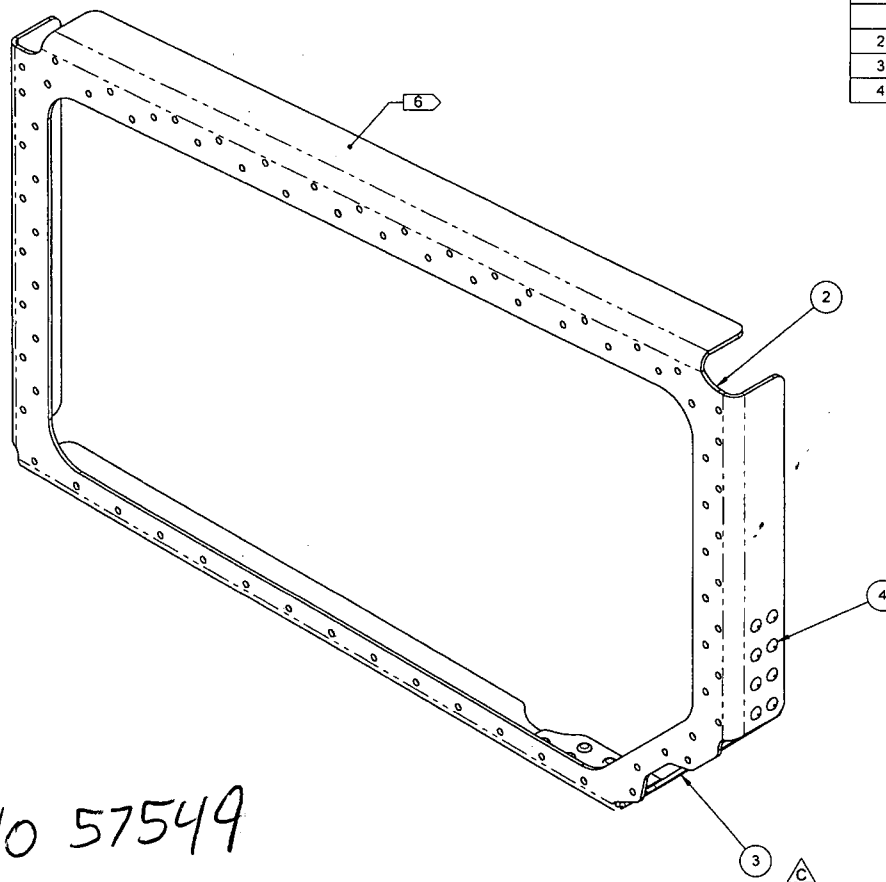
<b>Prototype Approval:</b> N/A
<b>Date:</b> N/A

Rev	Date	Change	Revised by	Approved
A	04.08.24	New Issue	KJ/JLM	
B	06.03.09	Dimension 12.97 was 13.03	KJ/JLM	
C	08.11.27	Dimensions updated per Dwg Rev B	KJ/EC	
D	09.07.29	Dimension 2.100 was 2.072	KJ	
E	09.09.14	Dimensions updated per Dwg Rev C	KJ	

# Value stream mapping during Kaizen event.



ITEM NO.	QTY. -1	PART NUMBER	DESCRIPTION
1	X	D3294-1	BRACKET ASSEMBLY
2	1	D3294-3	BRACKET
3	1	D3294-5	DOUBLER
4	15	MS20470AD4-5	RIVET



**D3294-1 BRACKET ASSEMBLY**

**RELEASED**  
09/04/07

W/O 57549

**NOTES:**

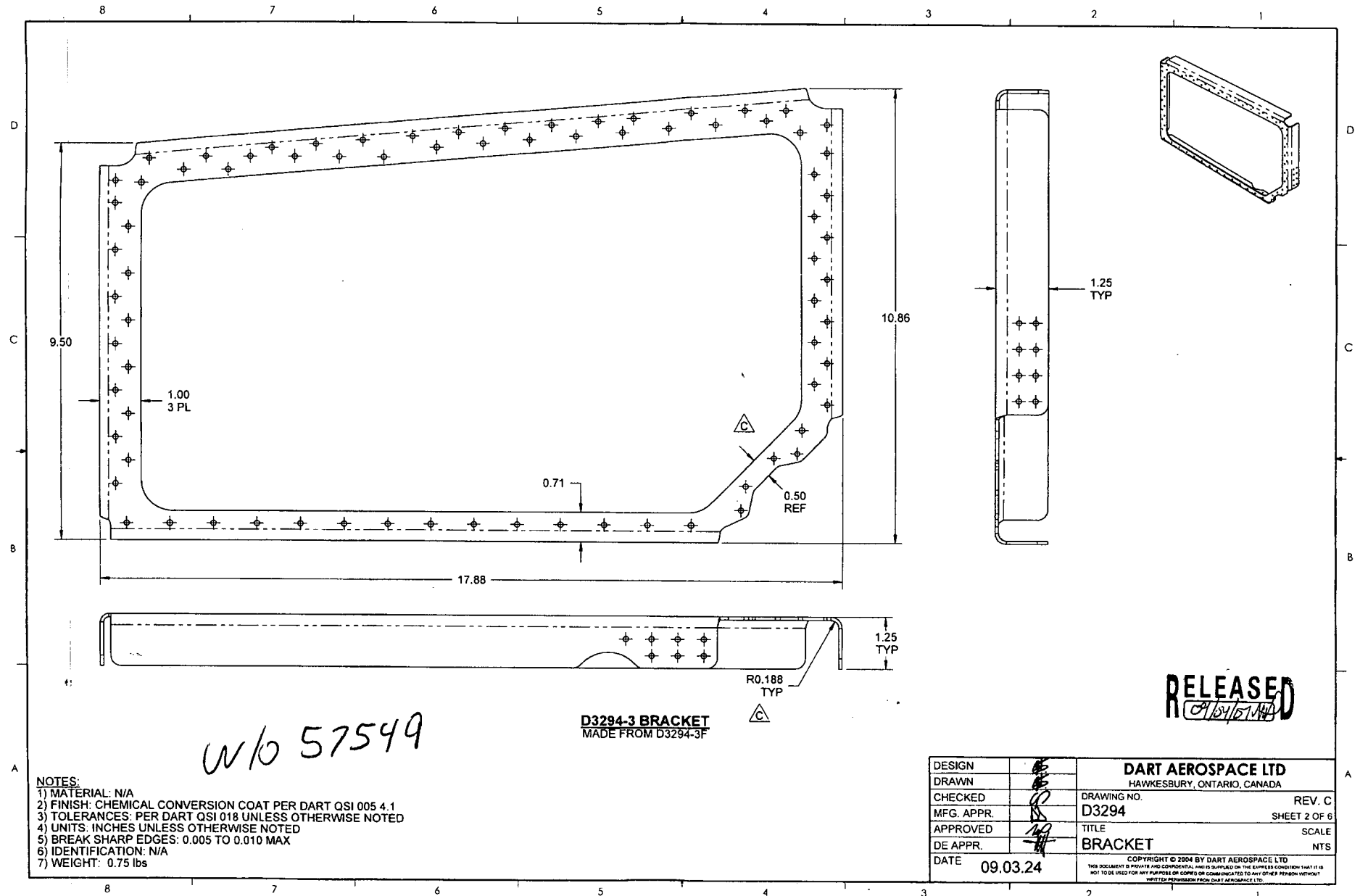
- 1) MATERIAL: N/A
- 2) FINISH: POWDER COAT "BLACK" (4.3.5.7) PER DART QSI 005 4.3
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: IDENTIFY WITH DART P/N "D3294-1 AND B/N" USING FINE POINT PERMANENT INK MARKER
- 7) WEIGHT: 0.83 lbs

REV.	DESCRIPTION	BY	DATE
C	REMOVE FLANGE PREVIOUSLY ADDED. ADD -5 DOUBLER ZN A4-1, SHEET 5+6.	HS	09.03.24
B	CHANGE FLANGE FROM OUTSIDE TO INSIDE, ZN B4-1, C3-2. CHANGE GRAIN DIRECTION, ZN C4-2	HS	08.09.22
A	NEW ISSUE	CP	04.06.28
DESIGN	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA DRAWING NO. <b>D3294</b> REV. C SHEET 1 OF 6 TITLE <b>BRACKET</b> SCALE NTS <small>COPYRIGHT © 2004 BY DART AEROSPACE LTD  THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>		
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	09.03.24		



***Lean Training Event***

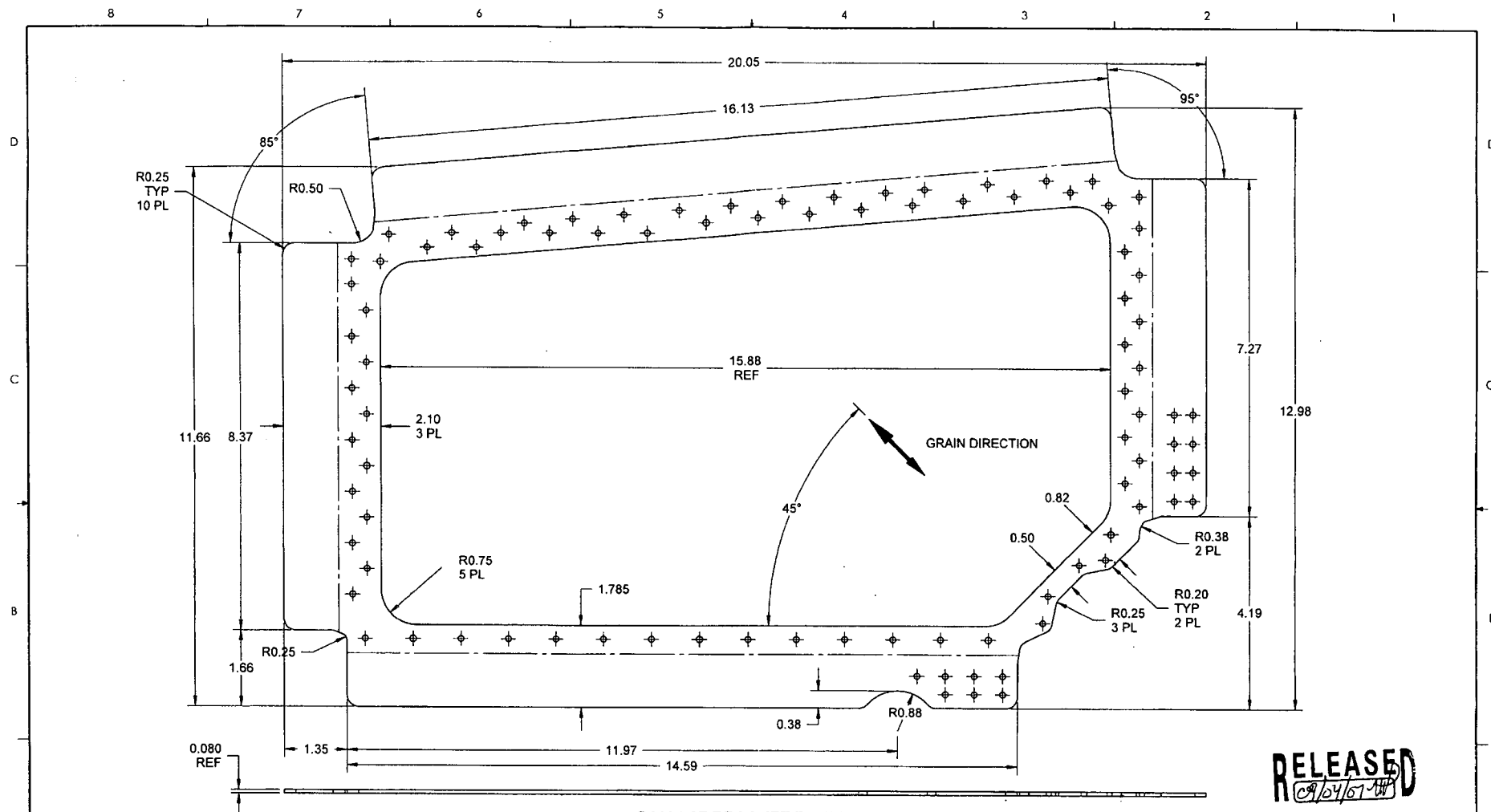




## Lean Is...

**“LEAN IS... A mindset, or way of thinking**

- **A commitment to achieve a totally waste-free operation focused on the customer’s success**
- **Achieved by simplifying and continuously improving all processes and relationships in an environment of trust, respect and full employee involvement**
- **It is about people, simplicity, flow, visibility, partnerships and true value as perceived by the customer.”**



**D3294-3F BRACKET FLAT PATTERN**

**RELEASED**  
09/04/07

**NOTES:**

- 1) MATERIAL: 2024-T3 ALUMINUM SHEET 0.080 THICK PER AMS-QQ-A-250/4 OR AMS 4037 (REF DART SPEC M2024T3S.080)
- 2) FINISH: N/A
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: N/A
- 7) WEIGHT: 0.75 lbs

*w/o 57549*

DESIGN		<b>DART AEROSPACE LTD</b>	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. C
MFG. APPR.		D3294	SHEET 3 OF 6
APPROVED		TITLE	SCALE
DE APPR.		BRACKET	NTS
DATE	09.03.24	<small>COPYRIGHT © 2004 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED FOR ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

## Lean Is...

- “LEAN IS – from an operations perspective... a system that cuts costs & inventories rapidly to free cash, which is critical in a slow economy. It also supports growth by improving productivity and quality, reducing lead times and freeing huge amounts of resources.
- Lean aims at reducing (if not eliminating) none value added activities in business processes.
- It's not a project.

LABEL	HOLE Ø
ALL HOLES UNLESS NOTED	0.1285 (#30 DRILL)
A	0.141

**D3294-3F BRACKET FLAT PATTERN**  
SUPPLEMENTAL

w/o 57549

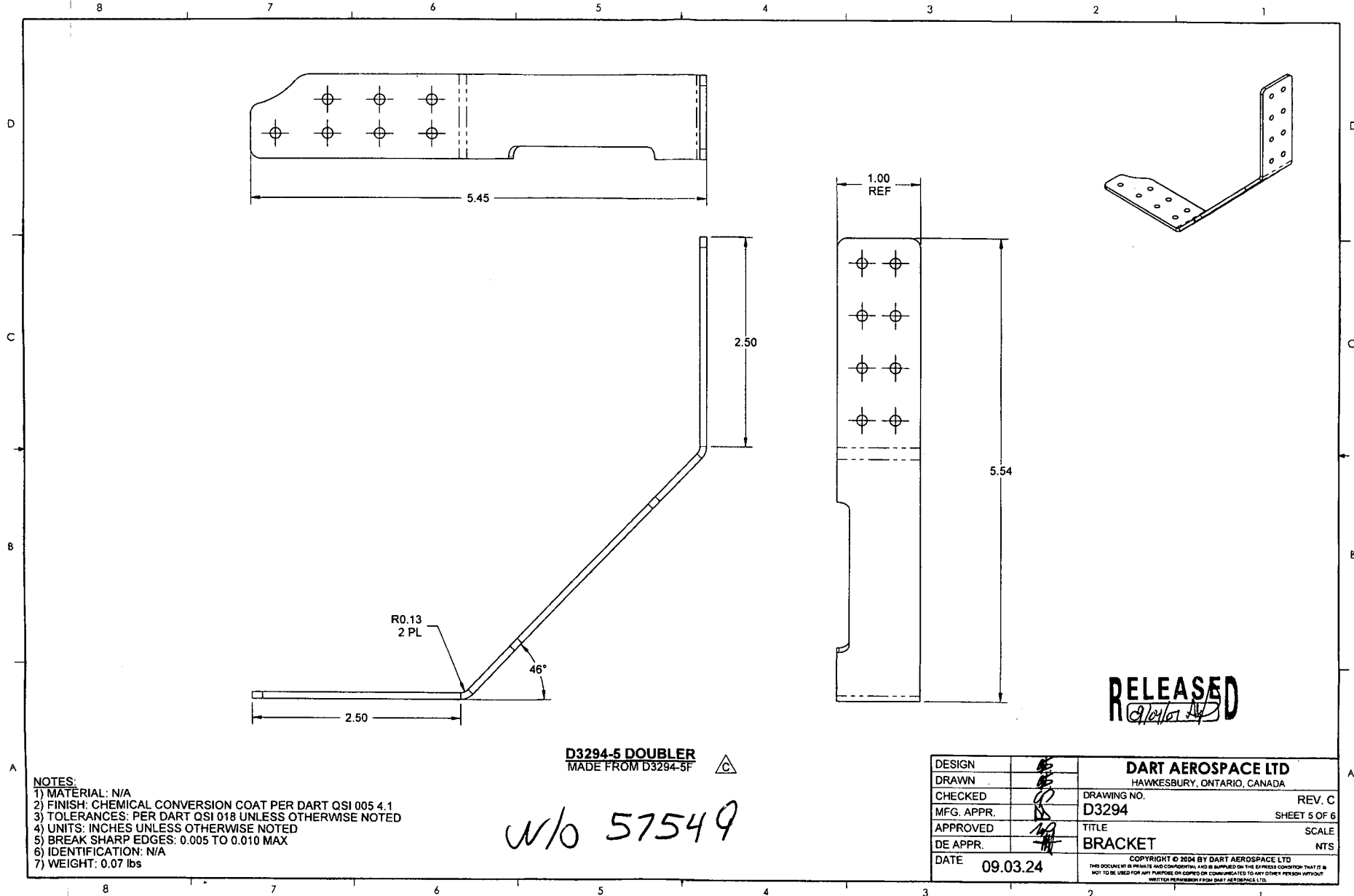
DESIGN		<b>DART AEROSPACE LTD</b>
DRAWN		HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. <b>D3294</b> REV. C
MFG. APPR.		SHEET 4 OF 6
APPROVED		TITLE <b>BRACKET</b> SCALE NTS
DE APPR.		
DATE	09.03.24	

**RELEASED**  
C9/04/07

COPYRIGHT © 2004 BY DART AEROSPACE LTD  
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS  
NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT  
WRITTEN PERMISSION FROM DART AEROSPACE LTD.

## Lean is...

- Promote customer-orientation rather than resource-orientation (produce for sales not for stock).
- A highly evolved method of managing an organization to improve the productivity, efficiency and quality of its products or services.
- Transforms how the company operates and how employees think about their work. Don't work harder but smarter by transferring your energy from the NVA to the VA activities.
- Has no end (there is no "done").



## Lean principle

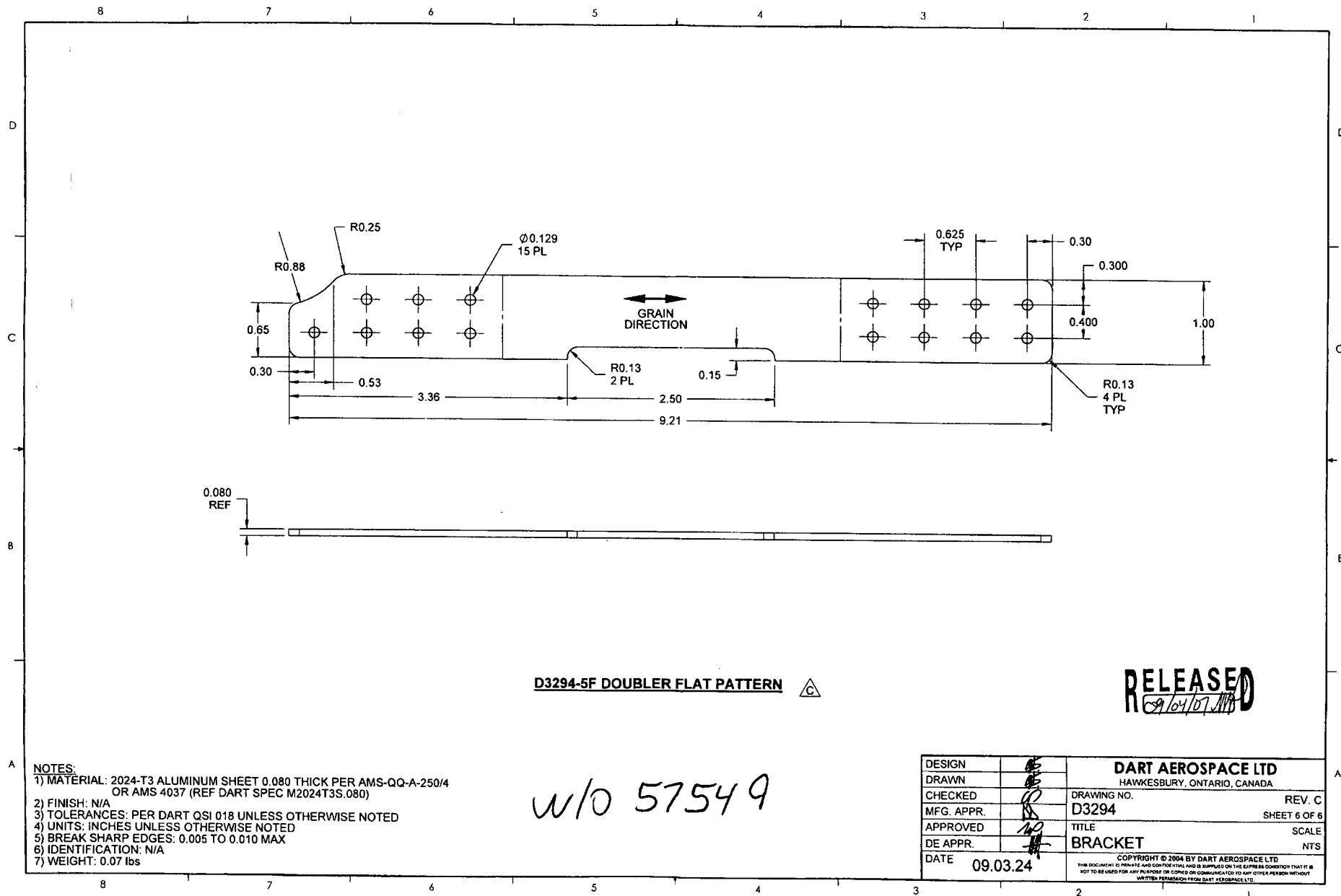
To be able to produce exactly:

- **what is required**
- **when it is required**
- **the quantity required**

by the next step in the process.

**Once a job started, it should ideally never stop**





## Value stream mapping

- Value stream mapping is **the best way to identify where the high payoff** opportunities are, yet value stream mapping is the lean tool most likely to **not be used by** companies doing pretend lean!